The Contribution of Educational Video Games to Learning Graphemes

La contribución de los videojuegos educativos al aprendizaje de grafemas

Christopher Hartnett
Director de Primaria y profesor en West End Idiomas

Abstract

This study analyzes the amount of learning that takes place through an educational videogame created to teach young learners initial letter sounds in English. A control and experimental group of ESL learners were examined in order to compare advances in grapheme recognition through gameplay against those learning from traditional methods. All students were given pretests to identify prior knowledge of phonetic sounds. Then the experimental group was taught using chants, powerpoints and worksheets while the control group played the game. All students were then re-evaluated with a posttest to see if their scores increased and learning was compared across groups.

Key words: motivation, phonics, educational videogames, ICT.

Resumen

El presente estudio analiza el grado de aprendizaje que proporciona el uso del videojuego educativo para enseñar los *speed sounds* del inglés en edades tempranas. Se comparó el progreso en el reconocimiento de los grafemas por parte de dos grupos de alumnos: uno de control en el que se emplearon métodos tradicionales y otro experimental en el que se utilizó el videojuego. Primero se realizó una prueba de evaluación previa en ambos grupos. Después se implementaron dos metodologías diferentes: los estudiantes del grupo de control aprendieron mediante canciones, PWP y fichas, mientras que los estudiantes del grupo experimental emplearon videojuegos. A posteriori se realizó una nueva prueba de evaluación a fin de sopesar si el conocimiento de los estudiantes había evolucionado de manera positiva y en qué grado, contrastando así los resultados de los dos grupos.

Palabras clave: motivación, *phonics*, videojuegos educativos, TIC.

ISSN: 1576-5199
Fecha de recepción: 15/03/2017
Fecha de aceptación: 31/03/2017

1. Introduction

According to the Centre for Educational Research and Innovation (CERI) - Brain and Learning, «reading is the process of decoding and grasping verbal language in print or script» (Davis, 2005, p. 4). In order for an individual to become literate in a language, they must build mapping skills which link written symbols to units of sounds (Davis, 2005). In alphabetic languages such as Spanish and English, these written symbols take place in the form of letters called graphemes (Reis-Frankfort, 2011) and the sound(s) which are produced by those letters are known as phonemes (Yopp, 1992). The ability to hear and manipulate phonemes plays a causal role in the acquisition of beginning reading skills in one's native language (Smith, Simmons & Kame'enui, 1998). As phonemes are correctly correlated to their graphemes, it leads to the realization of the alphabetic principle and enhances phonemic awareness, (Yopp, 1992).

Research clearly illustrates that a monolingual student's level of phonemic awareness is an accurate predictor of how successful that student will be at reading in his or her native language (International Reading Association, 1998). In fact, it is a better predictor than alternative measures such as global exams or general language proficiency (Griffith & Olson, 1992). Research also indicates that phonemic awareness is a transferable skill across languages (Durgunoglu, Nagy & Hancin, 1991). Therefore, I consider targeted instruction of phonemes and graphemes to be a necessary and essential part of foreign language teaching. It my belief that explicit teaching of phonemic awareness would help my EFL students recognize the phonemic similarities and differences present between their native language (Spanish) and the target language (English) which would significantly contribute to their ability to read and write in English.

Admittedly, although I recognize the importance of phonemic instruction, I have always found it to be a very challenging area of language to teach. An individual EFL student's ability to properly identify graphemes in their native language is subject to variation. This implies that developing a personalized learning environment is required in order to accommodate the differences in phonemic knowledge present in a given classroom. However, I often find it difficult to provide extended time to individual students due to their lack of autonomous skills as well as the sheer number of young learners present in a standard sized class. This often leads me to rely on exercises and drills which

increase the phonemic awareness of the class as a whole. Unfortunately, at times this jeopardizes student interest and fails to address the individual needs of certain pupils. Nevertheless, ESOL guidelines which promote good practice suggest that,

> Phonemic awareness experiences should help develop positive feeling towards learning a new language. The teacher should avoid drill and rote memorization activities. Engaging the students in playful and fun activities will promote an environment where students will be comfortable playing and taking risks with the language. (Broward County Multicultural ESOL Program, 2007, p. 4).

In an effort to provide an enjoyable, personalized learning experience for my students, I began investigating the use of digital games and digital technology for teaching purposes. I was able to locate research which demonstrated that significant learning gains were made in relation to their support in reading instruction with young children. In the book *Reading Assessment and Instruction for All Learners*, the authors discuss a handful of studies which indicates that «computer-mediated instruction increases the reading achievement of low-achieving students, ELLs, and students with learning disabilities» (Shcumm, 2006, p. 438). However, indications from a report stemming from The National Reading Panel which reviewed research on technology and literacy skills from 1987 to 2002 suggest that published research in this field is limited. They were only able to locate twenty one studies and provided insight as to why stating:

> Because computers available in schools have only recently reached high levels of performances for multimedia, speech recognition, text analysis, and networking, there has not yet been time to conduct the studies necessary to build a solid research base on the many ways in which technology can support reading instruction. (Education Development Center, 2004, p. 5).

Furthermore, recent studies seem to have the tendency to focus on the influence of educational video games on motivation to attend and engage in the class or subject being taught and not on the contributions of that game on academic performance (McClarty et al., 2012).

As the development of digital games progresses and their use in the classroom becomes more prevalent, I believe it is imperative that educators evaluate to what degree they actually contribute to student learning. Due to the

attractive qualities that educational video games have to offer, I have made them an integral part of my teaching practice and currently use one which is designed to teach young learners to identify phonemes and correlate them to their respective graphemes. Therefore, the focus of my research will be to analyse the following question: Does the digital game contribute to a higher level of grapheme identification when compared to common classroom teaching instruction such as using power points, classroom games and/or worksheets?

In light of the provisions to provide an enjoyable learning experience as well as offer the necessary personalized learning opportunities for young EFL students to build phonemic awareness, I have developed the following hypothesis: The use of the digital game *Teach Your Monster to Read* will reduce common factors of stress and distraction which can be found in a classroom environment. Furthermore, the use of this digital game will provide the necessary means for students to receive personalized information about their performance and learning which will in turn prove to be a more efficient source when compared to commonly used teaching methods (i.e. power points, games and oral drills).

The objectives of my research include several steps. The first is to identify what previous knowledge students have about English graphemes before teaching them or having them play the digital game. This would give me insight as to the potential knowledge that they will have transferred from their native language. Then, I will compare the learning gains made through gaming and classroom learning. Finally, I will analyse the ratio of those learning gains to the time invested in gaming and teaching in order to see which teaching resources prove to be more efficient.

What follows in this paper is previous research that has been carried out which further highlights the benefits of phonemic and phonological awareness as well as the role they play in language acquisition. Next, I will define the meaning of educational video games and I will discuss some of the positives and negatives associated with them and young learners. Then, I will present the methodology and work plan behind the action research project that I conducted followed by the data and findings which stemmed from it. Finally, I will present a plan of action based on those findings and I will conclude the paper with the implications that the study may have on future research and teaching practice.

2. Literature Review

2.1. Phonemic and Phonological Awareness

Phonemic awareness deals with the smallest units of language such as phonemes and graphemes and is a pre-requisite to the development of an encompassing term called phonological awareness which deals with manipulation of sounds at a syllable, word and phoneme level (Yopp, 1992). There is a substantial body of research on monolingual students which demonstrates the positive contributions that phonemic and phonological awareness has on a wide array of entities that are inherent in language learning such as: word identification, accuracy of oral reading, reading comprehension, fluency, pronunciation and spelling. The contribution that they make on literacy skills enhances the potential development of autonomous learning which significantly impacts the future acquisition and use of language. In terms of EFL students, studies conducted by Goswami (2002), Kobayashi, Haynes, Macaruso, Hook & Kato (2005) and Wimmer (1993) «have shown that phonological awareness is closely related to literacy skills development in a range of languages with varied orthographies and the phonological awareness has been shown to transfer from the first language to the second» (Ayre, Haynes, Hook & Macaruso, 2010, p. 1). More specifically, Martínez-Martínez (2011) conducted research on teaching phonemes and graphemes to first year EFL students in Colombia and found that it improved their reading comprehension because they were able to decode and pronounce the words being read more accurately which led to better understanding of the message being delivered through the text.

2.2. Educational Video Games

A major difference between educational video games and commercial video games can be found in terms of design. While both are intended to be entertaining, the former places importance on being used for educational purposes. Goals are integrated in the game in such a way that students learn predetermined information based on a particular theme. In the case of an educational video game designed for language learning, students would be confronted with challenges that are geared towards the acquisition of specific language skills. These skills would vary depending on the language level that the game was designed for. Although much has been published on the use of commercial video games for educational purposes, all research and

investigation in this paper is solely focused on the use of educational video games and their potential contribution as a teaching resource.

2.2.1. Benefits of Educational Video Games for Young Learners

According to the journal article *Computer-Based Edutainment for Children Aged 3 to 5 Years Old* written by Man-Ying Cheung, Koon-Ying Raymond Li & Tim Zapart, educational video games offer three major benefits to young learners; They help students understand speech or text by giving them context through visuals. They provide a space for meaningful interaction and they play upon students curiosity as well as their exploratory tendencies (2006, p. 93). Typically, children between the ages of three and five years old are incapable of reading because they do not have the skill set to do so. Educational video games provide scaffolding for young learners in the form of animation and sound (Bruner, 1975; Kafai, 1994; Quintana et al., 2004). Additionally, many games offer virtual characters and settings which youngsters can explore on their own. As they do so, they encounter small tasks that can be completed which improve autonomous learning skills (Reiser, 2004).

As Dewar points out, Merrilea Mayo, an established consultant in innovative, technology claims that the ability for learners to control navigation of educational games has been linked with better learning outcomes (Dewar, 2010). One of the reasons that games are successful in terms of user control is due to the fact that they can be adapted to the pace of the learner. A great majority of games consist of complex tasks which are broken down into a series of small steps. Depending on the ability of the learner, some will be able to overcome easier challenges integrated within the small steps allowing them to arrive to more complex challenges quickly. Other students that need more time, will have more opportunities to repeat challenges that they struggle with and will only advance when they are ready to do so. In addition to these positive entities, Mayo states that, «games can give learners immediate and continuous feedback» (Mayo, 2009 cited in Dewar, 2010, p. 1). Often positive feedback is given in the form of points, prizes or level advancement. By contrast, corrective feedback is given during game play when: students lose a life, lose points or are forced to repeat a level. Much of how feedback is given is dependent upon the game, but it is almost always given.

2.2.2. Disadvantages of Educational Video Games for Young Learners

One of the biggest disadvantages of educational video games for young learners is how engaging the game can actually be. In chapter one of the latest volume of the British Council's Innovations series called *Emerging Technologies, Emerging Minds: Digital Innovations within the Primary Sector*, the authors state «Ironically, the engaging nature of digital games can sometimes be a distraction from the overall learning objective, because pupils get caught up in the notion of 'solving the problem' or 'winning the game'» (Pim, 2013, p. 33). If what students learn is used for the sole purpose of advancing in the game and they do not recognize it as something which can be applied outside of it, then the educational value that it has to offer is non-existent; thus, rendering it an ineffective pedagogical tool. This argument is further supported in a review of literature entitled *The Use of Computer Games and Video Games for Learning* in which the authors make reference to work carried out by Clarke (2003) who states, «Games require a suspension of belief. It may be difficult to retain learning acquired in that state» (as cited by Mitchel & Savill-Smith, 2004, p. 24).

An additional problem associated with educational video games and young learners is that children typically have underdeveloped motor skills and relatively little to no experience with computers. Results from research carried out which investigated young children's motor skill ability in relation to controlling the pointer on a mouse suggest that they often found it difficult to hold the mouse steady over a small target object on the screen while simultaneously accurately pressing the mouse button over the desired target (Crook, 1992). As a result, students can become frustrated and lose interest. Furthermore, games that register results which intend to give feedback on learner performance do not incorporate errors of this nature and, therefore, may be flawed in terms of validity.

3. Methodology and Work Plan

In order to see if digital games contribute to a more effective way of teaching grapheme identification when compared to common classroom teaching instruction such as used power points, classroom games and worksheets, I

began by selecting a suitable digital game. The name of the game that I chose is *Teach Your Monster to Read*. Its primary aim is to develop children's speed and accuracy of grapheme recognition. It focuses on thirty one of the most basic graphemes: <*s, a, t, p, i, n, m, d, g, o, c, k, ck, e, u, r, h, b, f, ff, l, ll, ss, j, qu, v, w, x, y, z, zz*>. There are eight levels in the game and each level teaches four graphemes, apart from one level which teaches three.

After selecting the game, I created a work plan composed of five stages. The first stage was to create a control group and an experimental group composed of first year foreign language learners. The second stage was to develop a pre-testing method in order to see what prior knowledge students had about the English graphemes which would be presented throughout the study. This was done in the form of a quiz (see appendix A-F). The graphemes which would be the focus of instruction and game play, were broken down into eight sets thus mimicking the layout of the digital game. Prior to any teaching or gaming of each set of graphemes, a pre-test quiz was given to both the control group and the experimental group (see appendix A-E). The pre-tests were composed of four questions (apart from the level in the game with three graphemes) in which a series of different letters were given as possible answers for each question. After I orally dictated the sound of the grapheme for a given question to the class, students were required to circle the letter which they thought correlated to that sound. Upon completion of each quiz, they were collected, corrected, and the results were documented.

For the third stage, students in the control group were first given a power point in which I introduced the sound. Then we would play different grapheme recognition games and finally they would complete a worksheet. Sometimes the drill/game would be for the students to clap when they saw the correct grapheme which correlated to the sound. Other times, they were required to hold up a paper cut out of the correct letter associated with the grapheme. In contrast, the experimental group was never taught. They simply played the digital game.

The fourth stage was post-testing. Students were given a small post-test which was similar to the pre-test (see appendix A-E). Once the post-tests results were recorded, I analyzed the data to see if any learning gains were made and I compared the results from both the control group and the experimental group to see which teaching medium was more successful. In the fifth and final stage, I calculated classroom teaching time and gaming time in rela-

tion to the learning gains made in order to see which one was a more efficient way of teaching the graphemes.

4. The Study

4.1. Context

There are twenty six students in both the experimental group and the control group. The groups consist of English foreign language learners in their first year of primary school. Their ages range between six and seven years old. The majority of them have had English classes previous to entering first year; however, their level of English is restricted to basic vocabulary and a very limited amount of short phrases in present tense used to communicate basic needs.

The school is located in Navarra, Spain. All students throughout primary have English class five hours per week. In addition to these weekly hours, they are taught four hours of Science and one hour of Arts in English. The school offers good resources such as digital cameras and whiteboards in every classroom as well as two computer labs which hold up to thirty desktop computers.

Due to the abundant presence of English throughout my students´ academic career, it is evident that strong literacy skills in the target language are essential to their success. This mimics the current situation in Spain as well as Europe where English is becoming increasingly present in school curricula. In addition, many schools are beginning to implement the use of technological resources and publishers are starting to create materials that can be used to enhance teaching. However, very little is known as to how beneficial it is on student learning. Taking into consideration the importance of English literacy skills and the fact that my school offers quality digital resources, I decided to take advantage of the opportunity in order to investigate effective strategies in which they can be used. In this case, I focused specifically on educational video games.

The game that I chose is currently a free resource which was created by a charity called the Usborne Foundation. The developers incorporated a team of educational advisors with an expertise in synthetic phonics teaching in

order to make sure that the game met the standards outlined in the United Kingdom's language curriculum for young learners. After contacting a representative of the staff, I discovered that the rubric which was used to develop the game was based off of the publication *Letters and Sounds: Principles and Practice of High Quality Phonics* (2007) which was created by the Department for Education and Skill in Great Britain. It is a set of guidelines which includes activities and areas of student development that are intended to inform practitioners on how to teach graphemes.

In the game students create their own character in the form of a monster. In order to do so, they need to enter their own username and password. When registering for the game, I entered the class lists and all passwords were automatically generated. Once individual accounts are created, students travel through a series of different islands. Each island contains a set of graphemes. They can only travel to another island once they have completed a series of challenges. One particularly advantageous feature of the game is that it is adaptive. Graphemes that the student struggles with come up in mini-games more often. Additionally, a progress report is automatically generated for each student. Percentages are given on each grapheme based on task completion and are intended to give teachers information which reflects how well students can recognize letter sounds. However, it is important to note that all data collected for the study was done so through the previously mentioned pre/post-tests.

4.2. Data collection

My main goal when collecting data was to quantify the contribution that the educational video game had on learning graphemes by comparing results from the control group and the experimental group. However, it took time for students to become familiar with the process of the study. Many students repeatedly asked me for clarification on what they had to do for pre/post-tests and the majority of students in the experimental group lacked the necessary skills to use a computer. Therefore, I decided that the first twelve graphemes <*s, a, t, p, i, n, m, d, g, o, c, k*> would not be recorded as data. Instead, they would be used as an introductory phase in order to familiarize students with what they had to do so that results were not skewed due to confusion or uncertainty involved in the tasks. Once the introductory phase was finished and all students understood each task that was required of them, I began to record the data.

After collecting the data from pre-tests and post-tests, I organized it by student and by grapheme (see Appendix F-O). This was done in order to see how many errors were made per class as well as per student. It also enabled me to see which graphemes learners struggled with and whether or not they improved after teaching/gaming. After all data was collected and organized, I compared the ratio of improvement according to the teaching medium used with the intention of revealing whether or not the educational video game could in fact be considered a more effective resource than power points, classroom games and worksheets.

5. Data Analysis

All pre-tests and post-tests were composed of four questions with the exception of one which was composed of three. For the first set of four graphemes used in the study, I limited possible responses in the pre-test to those four letters. I repeated this process for the next set of four graphemes. Finally, for the last three sets of graphemes I augmented the number of options of responses by incorporating graphemes that students had previously encountered in the game or through teaching.

Table 1. The number of response options per question and the letters used in each quiz can be seen in the graph below which reads from top to bottom. *Source*: Author.

Graphemes set 1: CK, E, U, R	Graphemes set 2: H, B, F, FF	Graphemes set 3: L, LL, SS	Graphemes set 4: J, QU, V, W	Graphemes set 5: X, Y, Z, ZZ
Four quiz response options per question.	Four quiz response options per question.	Six quiz response options per question:	Six quiz response options per question.	Six quiz response options per question.
Letters used: CK, E, U, R	Letters used: H, B, F, FF	Letters used: CK, L, LL, U, R, P, SS, H, B, C, FF, N	Letters used: J, QU, V, W, B, FF, W, R, P, C, H K, N, SS, J, L. U, G	Letters used: Z, Y, X, S W, SS, ZZ, C

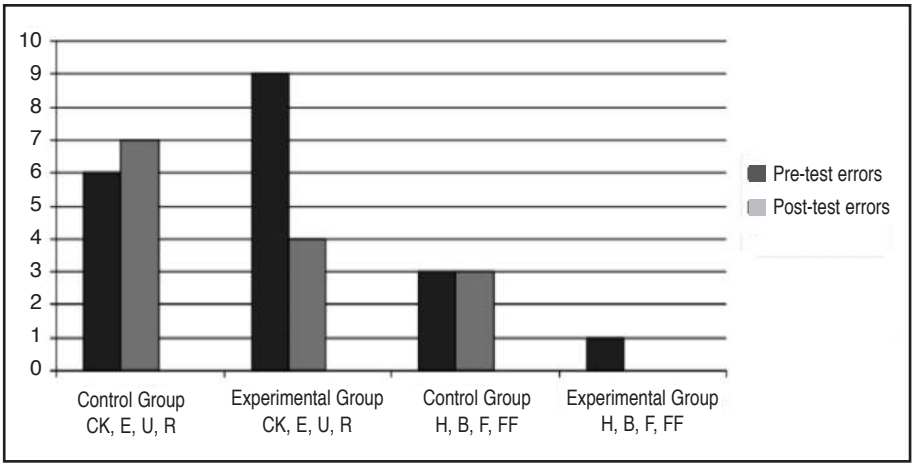
In order to analyse data, errors in pre-tests were extremely important. Once errors were identified both individually and as a class in the pre-tests and then again in the post-tests, contributions made by teaching and game play would be made visible in the data.

5.1 Findings

In this section, I will begin by presenting the data for the first two sets of graphemes with four response options: <ck, e, u, r> and <h, b, ff, f>. Then, I will analyse the data whilst providing explanations as to why students registered those scores. Once the first two sets have been covered, I will do the same for the last three sets with six response options: <l, ll, ss>, <j, qu, v, w> and <x, y, z, zz>. Finally, I will compare the contribution that the educational video game and teaching made on student grapheme recognition by showing the percentage of increased correct responses that each one accounted for.

As Figure 1 shows, the educational video game increased learning whilst traditional methods caused slightly increased errors or had no impact on the amount of them.

Figure 1. Feedback from the analysis of pre-tests and post-tests for the control group and the experimental group.
Source: Author.



However, this is not to say that on an individual basis some students did not improve after instruction. Upon further review of scores recorded by each

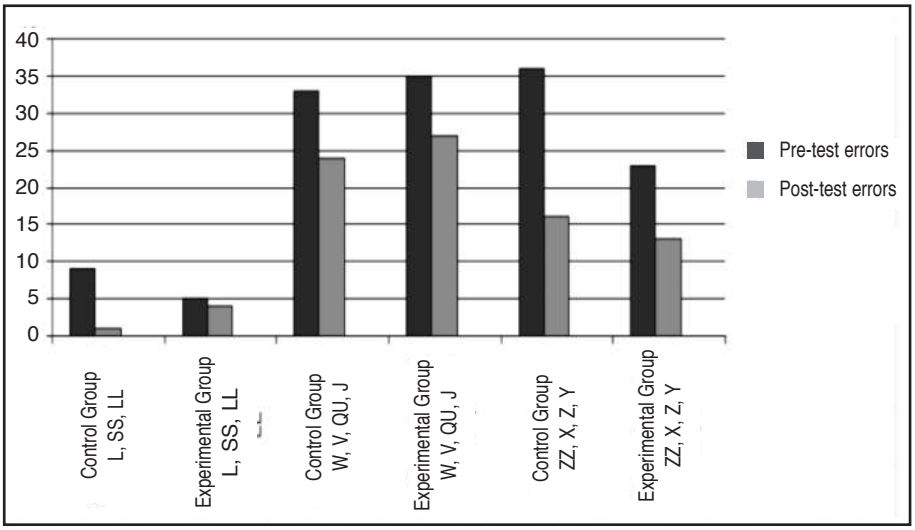
individual student in the control group for the graphemes <CK, E, U, R>, I found that two of them slightly improved, one of them made the same mistakes and two others actually scored worse than they originally did on their pre-test. This would imply that the influence of instruction on an individual basis was beneficial for some students, but detrimental to others. The same is true for the educational video game; however, it had more positive rather than negative contributions towards recognition of graphemes on an individual basis and, therefore, led to an improved group score which is reflected in the graph above.

Upon further analysis of the control group's scores for the first four graphemes <*CK, U, E, R*> in question (see appendix E) all errors were related to the short vowel sounds /*U*/ and /*E*/. If phonemic awareness transfers from one language to another as is suggested by Goswami (2002), Kobayashi et al. (2005), Wimmer (1993), Durgunoglu et al. (1991), perhaps the students incorrectly answered these questions due to the fact that the sounds which they carried over from Spanish did not apply to the vowel sounds in English. Errors that arose in the post-test demonstrated that some students learned these different sounds while others became confused and uncertain thus mixing them up at the time of testing. Students who had errors in the post-test were also the ones who incorrectly identified the graphemes <*CK*> and <*R*>. At this point in testing, students were given four options for each of the four questions. They had been taught the four graphemes and were aware that each answer would be different. A possible explanation may be that they knew that each grapheme they had been taught would appear on the test; therefore, they made sure that they marked a distinct one for each answer. If they had an error, then this would lead to multiple errors regardless of the sound associated with that grapheme.

One of the most surprising aspects that the data reveals is the relatively small amount of errors made by both groups involved in the study, especially since previous to year one they never had formal phonemic instruction. In fact, the experimental group only recorded one error in the pre-test of the graphemes <*H, B, F, FF*>. Should the experimental group have continued in this manner, there would be very little that the study would have reflected in terms of learning gains. I decided that the questions were too narrow in scope. Therefore, I slightly altered the pre/post-tests by incorporating a total of six response options instead of solely limiting them to the graphemes that they would learn.

This would also help students avoid the speculative errors found in the first set of graphemes where one error would most certainly lead to another regardless of the sound. The extra graphemes included in testing were ones that they had previously encountered in either the introductory phase or the above two sets that were used for initial testing. The augmentation in questions was applied to the final three sets of graphemes (set 1 <l, ss, ll>, set 2 <w, v, qu, j> and set 3 <zz, x, z, y>). The results can be seen below in Figure 2:

Figure 2. Feedback from the analysis of pre-tests and post tests for the control group and the experimental group.
Source: Author.



Although additional response options may have been a factor in the increase of pre-test errors recorded, it seemed to have little effect on the first set of graphemes: <*L, SS, LL*>. The last two sets of graphemes were more difficult for students and further support the idea that errors were made do to the fact that those graphemes do not share similar sounds to the students' native tongue. The graphemes <*V, J, ZZ* > and <*Z* > were the ones which registered the most incorrect answers and all produce different sounds in Spanish. In contrast, the graphemes <*L, SS, LL, W*> have similar sounds when compared to the L1 and barely recorded any errors. In any case, pre-test errors increased which provided more room for visibility in terms of contributions made by instruction and the video game.

The data demonstrates that both traditional teaching and educational video games contributed to learning of graphemes. In order to see exactly how much of a contribution there was for all of the graphemes, I calculated the percentage of increase or decrease in respect to the amount of correct answers registered in post-tests results compared to that of pre-tests. Below, in table two the contributions of teaching and the educational video game can be seen for all graphemes:

Table 2. Percentage of contributions made by teaching and by playing the video game per grapheme.
Source: Author.

	CK, E, U, R	H, B, F, FF	L, SS, LL	W, V, QU, J	ZZ, X, Z, Y
Teaching	-1%	0%	+11,6%	+8,7%	+19,6%
Educational Video game	+ 4,7%	+ 0,9%	+1,4%	+7,7%	+10,1%

In total, teaching improved student scores by 38,9% while the educational video game improved them by 24,8%. Contrary to my hypothesis, instruction proved to be more effective. However, it is worth noting that students in the experimental group appeared to be more motivated by the video game when compared to their counterparts who learned the same graphemes via traditional methods. The fact that students were able to play at their own pace and autonomously also seemed to reduce stress factors associated with teacher correction and time constraints which were present in the classroom setting. In addition, the more students played the more their learning increased whereas learning gains made through instruction was more sporadic.

Although teaching stemming from common practices accounted for more learning, the data suggests that it was not as efficient as the digital video game in terms of the ratio of time invested and its contribution to an increased score. Throughout the course of the study, ten days were dedicated to

each set of graphemes. During those ten days, pupils from the experimental group played the game once for forty five minutes while students in the control group were taught the graphemes approximately twelve and a half minutes per day. When dividing the total amount of time spent teaching the graphemes into the percentage of score increase across the study, the ratio of one minute of teaching time to increased score is. 6% whereas the ratio of one minute of game play to increased score is 1,1%.

5.2. Plan of Action

Based on these findings, it is clear that more common teaching practices make a larger contribution to student learning of graphemes when compared to that of the educational video game. However, the educational video game appears to be a more efficient resource for teaching them. By effectively incorporating both teaching and gaming into planning, I believe that it will lead to faster and greater learning gains for students. Therefore, my plan of action is geared towards improving how and when instruction time is used and the opportunities that the video game provides in order to make that time more beneficial for students.

As the data reflected in the pre-tests, students were familiar with some of the graphemes and could identify them even before being taught them. This was most likely due to the fact that the sound associated with those graphemes were similar to those found in their native language. The first step that I would take before even teaching English graphemes would be to consult the students' language teacher in order to have a better idea of the pupils whom are struggling with graphemes present in their native language. After obtaining information on individual students, I would highly recommend both pre-testing and comparing graphemes/phonemes found in the student's L1 with those that will be taught as a starting point for planning purposes. Should students correctly identify graphemes in the pre-test, it would suggest that instruction would not need to be given on them. This would then allow the teacher to focus more time on graphemes that students struggled with. After analysing the results, I would recommend that they be shared with students to make them aware of the graphemes that they need to concentrate on as well as confident about the ones that they already know.

Once instruction has been given on the graphemes that were more difficult for students, I would suggest giving a post-test. Any student which contin-

ued to struggle could then be taught one on one or in a small group. Although finding extra time to teach individual students is difficult, one of the major advantages of the video game is that it is an autonomous activity. While others play the video game in the computer lab the teacher can then spend time instructing weaker students. Once individual or small group teaching has been carried out, students can either go on to play the game or they can be given the website to play the game at home should they have the resources to do so. As students played it, they would continuously receive positive reinforcement which would only increase their confidence and solidify their learning.

6. Conclusions

6.1. Outcomes

The educational video game did not contribute more to students' learning of graphemes when compared to more commonly used teaching practice. However, I am still very pleased with the results. The students from the experimental group were extremely motivated by the game and they were very eager to play it. Learning gains were recorded and the game proved to be a useful teaching resource. It also served as a point of conversation amongst students. They discussed what level they were on, what they had to do to beat some of them and how many points or rewards they earned.

In addition to learning graphemes, students learned a variety of other skills which are worth mentioning. They learned how to: turn their computer on and off, to navigate the web in order to go to the link of the website, to type their name and password on the keyboard, to save their progress, to ask for help, to help others and to control the mouse and volume of their headphones. They also learned how to navigate through the game on their own as well as how to accomplish tasks that were required of them. Considering that they are only six and seven years old and that they were able to learn all of this in a foreign language, I believe that these are outstanding accomplishments. Furthermore, due to the recent and rapid advancements in technology and the digital world that is becoming increasingly important in daily life, these are valuable skills that they will most likely use in the future.

In contrast, the control group was not required to acquire all of the different skills which were necessary for the experimental group to acquire in order to learn the graphemes and that could very well have been an influential factor as to why the results of the study leaned towards the use of common teaching practices as a more effective means of teaching them. Students from the control group were already familiar with the classroom setting and less was required of them. They were therefore able to concentrate solely on the graphemes that were presented to them. The opposite is true in regards to the experimental group which needed to develop all the aforementioned skills in order to play the game before even learning them. This may be why the data showed a steady and gradual rise in their learning. Students were slowly getting used to the routine of going to the computer room and learning the necessary steps that they needed to take in order to play. Learning all of the skills related to the process of playing the game as well as learning the graphemes was difficult at first, but as students became comfortable with all of the entities involved in game play they enjoyed it more, focused more on the graphemes, and demonstrated increased learning gains throughout each week of the study.

6.2. Implications

The objective of this study was to discover if educational video games make contributions to young second language learners' ability to recognize graphemes and whether or not they would be larger when compared to those found using common teaching practices mainly through the use of power point presentations, worksheets and classroom games. While the results demonstrate that instruction proved to be more effective, significant gains through gaming were registered and were rising at a steady rate as students became more accustomed to playing the game and learning how to use the computers in order to play it. This would suggest that if students would have acquired basic computer skills before playing, there would have been less distractions and challenges to overcome thus allowing them to solely focus on playing/learning graphemes.

Although I did my best to remove this factor by implementing an introductory phase allowing students to familiarize themselves with the testing process, the game and the computers, it is possible that more time was needed for it to be removed entirely. However, the longer I waited, the less data I was able

to collect and had I waited too long I would not have been able to gather enough feedback and evidence to realistically calculate the contributions of the educational game to learning. Furthermore, although the data demonstrates that the more students played the more they learned, it is difficult to say whether or not contributions to grapheme recognition would have continued to rise should the study have carried on.

An additional variable which may have affected the study was time. Students from the experimental group played the game for about forty minutes and were required to identify all of the graphemes presented in the level of the game after they played it. In contrast, the control group was taught graphemes for approximately twelve and a half minutes each class over the time span of about two weeks. The reason for the increased amount of time was due to the fact that students completed worksheets and played classroom games which were more time consuming when compared to that of the educational game. It may be possible that regular exposure to phonics instruction as opposed to a short forty minute gaming session lead to an increased contribution to grapheme awareness therefore skewing the data in favour of more commonly used teaching practice such as power points, classroom games and worksheets. However, this would also imply that the educational video game was much more efficient teaching tool because the learning gains which took place through gaming took less time.

I consider my research to be successful in terms of collecting data which demonstrates the contribution that *Teach Your Monster to Read* towards student ability to recognize graphemes. Nonetheless, it is important to note that this does not mean that all games which claim to be educational video games will help students learn. The market for this sector is growing at a rapid rate but the characteristics which need to be incorporated in a game for it to be considered effective in terms of contribution to academic performance is still undetermined. Until those characteristics are established, it may be difficult to sift through and filter which games are effective teaching tools and which are not. On the other hand, if features of effective educational games are established, it would help game designers become more efficient in their creation of games which promoted learning and it would give teachers a guideline which they could use when considering which games they should choose in order to accomplish their teaching objectives.

In addition to studying how educational videogames can improve learning, I believe that it is important to study the aspects of language which can be transferred and used in others. This would save students a significant amount of time in the learning process. It would also help linguists to group similarities and differences found in language characteristics which would reveal more about how they can be taught.

In conclusion, this study suggests that educational video games can be used as a supplementary measure for teaching young learners. The game which was used not only served its primary purpose in assisting students in the acquisition of specific language skills such as grapheme awareness, but it also lead them to learn basic skills related to digital technology which will prepare them for their lives in the twenty first century. As the use of digital technologies for both pedagogical purposes as well as for daily life increase, great implications are cast upon designers and teachers in regards to pinpointing the key features of what constitutes an effective educational video game where students truly learn. It is my hope that other researchers will choose to conduct investigations similar to the one I have presented so that those games which reveal positive findings could be compiled into a group and their characteristics can be analysed and cross-referenced. This would help provide insight as to what the components and aspects of an effective educational video game are and it could benefit a future generation which is already living and learning in a digital age.

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Cita de este artículo (APA, 6ª ed.):

Hartnett, C. (2017). The Contribution of Educational Video Games to Learning Graphemes. *Educación y Futuro: Revista de investigación aplicada y experiencias educativas, 37,* 127-148.